THE MAMMOTH.

A Mine Christened With Prophetic Certainty.

A Colossal Property to be Worked on a Colossal Scale.

Tintic the Coming District.

The Mammoth Mine, at Tintic, formerly owned by Mr. J. A. Cunningham, the McIntyre Brothers and others, has always been looked upon as a most valuable property, and of great promise. Originally it was worked for milling ore, but in a short time, ore was discovered which contained metals that could only be extracted by the smelting process. Consequently, four reverberatory furnaces were erected at a point about seven miles south of the mine, in the valley. An ore crusher, run by steam, with a capacity of about 100 tons per day, was put up on the property and the ore crushed by this means. As drifts and levels were run, pockets of ore remarkably rich in gold, were occasionally run across, and this ore would all be taken out before the work was prosecuted further. The effect of this process—first taking out the milling ore and leaving the smelting, and then taking the smelting and allowing the milling to remain, with the occasional emptying of gold pockets, was to leave portions of the mine not as safe as they might have been. The mine was timbered with the surrounding cedars, of a smaller size than was desirable, and these, as the excavations were enlarged, proved to be wholly inadequate. The mine, however, notwithstanding the primitive manner in which it was worked, was a source of profit to its owners, and undoubtedly would have been so still had they still continued to retain it.

A year ago last December W. H. H. Bowers, well-known in mining circles here, took a bond on the mine, and worked the property with a view to its sale. In place of the cedar timbers and brush lagging, he had larger timbers put in where the excavation had been so great as to leave very large chambers made entirely by the taking out of ore, and in which there had already been one very heavy cave. He also developed the mine in different parts, and had it, as far as possible, put in a shape which would show its extent and richness. During the autumn following, the English parties with whom he was originally connected in the bond, requested Hon. H. A. Monroe Butler Johnstone to visit the mine, and to have it reported upon by Mr. J. Taylor, a well-known mining expert, belonging to the firm of John Taylor & Sons, of London The report of the expert was so favorable, that the English syndicate, with which Mr. Johnstone was in communication, authorized him to erect furnaces and refining works, and to deal with the property as he deemed best, with a view to putting it on the English market as soon as the works were completed. With this view, Mr. F. E. Goodhart, of the firm of Goodhart & Metcalf, of London, is about to leave London to come to Utah to make final arrangements for the disposal of the property. Since the time that Mr. Johnstone took charge of the property, the Crismon Mammoth Mine has been the subject of considerable talk among mining men and those interested in that locality. With the change in the control, the aspect of the district, and the Mammoth Mine in particular, was entirely changed. Mr. Johnstone immediately began making preparations for the working of the mine on a scale in keeping with the character of the property. John W. Plummer, Esq., a man of large and varied mining experience, covering not only Montana, California and Nevada, but Lake Superior, was engaged and took charge of the operations. The mine was placed under the immediate charge of Mr. C. Johnson, a young man of large practical experience as a miner, in Utah, Montana, and Idaho, as well as elsewhere; and while work was prosecuted here with a view to vastly increasing the output of ore, preparations on a scale equally as great were making at the smelters, to handle the increased product.

THE SMELTERS.

Though it was already late in the season when this change took place, and while the expense of putting the property in shape for extensive working was largely increased in consequence of the unfavorable season, nevertheless Mr. Butler Johnstone having determined that no time should be allowed to pass unimproved, at once set to work, and the changes made were daily perceptible. A large force of men was put at work in the construction of frame buildings, and in preparation for the erection of new ones. Up to this time four furnaces were already up and in operation and these have been kept going constantly. The ore crusher used had a capacity of probably 100 tons of ore a day, and latterly it has been kept going day and night in order to supply the furnaces. It was at once decided to put up additional furnaces called reverberatory as distinguished from blast. Work on this was forthwith commenced, and part of the building, which will be of exceeding length and is of lumber, was put up, and with all possible speed several furnaces were placed in readiness. For some time past five in the new building have been working, as well as the four in the old structure, making nine in all, and this week two others were fired up, so that there are now eleven of the reverberatory furnaces in operation; and in course of a few days fourteen will be running. Each furnace has a capacity of about 3,200 pounds every twenty-four hours, and the furnaces are charged about every six hours. With nine furnaces a day, a car of matte of between ten and eleven tons has been turned out per day for some time past, and when the fourteen are running, this output will be increased about fifty per cent. Fifty per cent. at least, for it is a well-known fact that for some time after its completion, very often over a month nothing like its full capacity of output is reached by a new furnace. The absorption of metals in the bottom is so great that for the first three or four days, the whole of the charges is absorbed, and for a long time, only a small proportion of the charges, though an ever increasing proportion of matte, is rendered up; until, at last, the bottoms become solidified, and the furnace yields up; its full amount of precious metals. It is considered that even now, three of the nine furnaces have not yet attained their maturity. The product therefore of the fourteen, when they become veterans, must necessarily become very great.

The present plan is to put up twenty-two new furnaces, making, together with the old ones, twenty-six in all. These furnaces, supposing they are kept going in the same kind of ore, and run night and day, should have a capacity of at least three cars of copper matte daily, and be able to handle 125 tons of ore each day; which at the present rate would result in the production of $50,000 in copper matte each week—the present output being over $20,000 each week.

But the result will be better still, for

A REFINERY

has been planned, laid out and the work commenced; and work on it was suspended only because of the extreme cold weather, which was felt as severely at Tintic as anywhere else some three weeks ago. This refinery will enable the owners to extract all the gold and silver out of the matte before it is shipped away, and thus expense will be saved. The refinery will be put up early in the spring, and finished with the same haste and solidity which is characteristic of everything the new company does.

Immediately north of the large frame building the new ore crushers are to be placed, so as to make the transportation of ore from the crusher to the furnaces as light as possible, and add to the convenience and efficiency of the work to be done. The capacity of the old crusher is fully taxed in keeping the furnaces now fired up supplied with ore, so that additional crushers have become an indispensible requisite to the successful operation of the new furnaces, and three new Blake crushers are now being put up at the sight selected, with Cornish rolls and revolving screws.

CONCENTRATING WORKS

Have also been erected in the same vicinity. They are built by Mr. McKim, whose new method has been operated so successfully at Park City. These works are intended to be used in concentrating the tailings, some of which, after a careful assay, are shown to contain a vast deal of gold and silver, and which can be worked to great profit. The tailings on which the concentrating works will operate, were produced by the old mill, and assays have shown that only 45 per cent. of the metal was taken out, the remaining 55 per cent. running off in the tailings. The concentrating works, therefore, will be a source of profit in themselves, independent of the mine or smelters.

Other improvements are decided upon and contemplated in the same quarter. For instance, it has been so difficult, not to say expensive, to secure brick at the mill, that the company has determined to manufacture its own. The clay is there, and other materials, and what brick is needed will be manufactured on the ground, and the cost of transportation thus saved. This is particularly the case with reference to fire-brick, which has hitherto had to brought from Colorado at a severe expense in freight; whereas a fine material for fire-brick, containing 95 per cent. of silicia, lies close by, and has only to be quarried and transported to a kiln, the foundation of which is now erected on the property. As will readily be seen, this will be a source of great saving to the company, considering that each brick brought from Colorado costs 11½ cents, while those to be manufactured will cost just the same as common brick, while the quality is considered even superior to the Colorado article. We believe the company will soon be prepared to make a trade in this article. A fine, new boarding house, capable of accommodating over 200 men, has been put up, and when the plans of Mr. Butler Johnstone are fully matured and executed, the works of the company will be a town in themselves. Everything that can add to the efficiency of the work, to the economy of operations, and to the comfort, health and well being of the workingman has had a thought and a care in Mr. Johnstone's mind.

The place, the buildings and the surroundings generally remind one more of a Montana mining country rather than of a place in Utah. The difference in the country, however, is that Montana's low hills are well wooded with thriving pines, while at Tintic there is an abundance of thick and bushy cedar trees.

THE MINE,

As before stated, is some seven or eight miles north of the smelters, and is up in the hills. There is little or nothing in the scenery to attract one's attention, but a vast deal in the mine itself. What would ordinarily be considered a serious obstacle to the working of the mine has proved a decided advantage—all the water used for culinary, drinking, engine and other purposes alike, has to be hauled to the mine a distance of nearly eight miles. The good fortune in this consideration is explained in this wise: As a mine is worked deeper, the more difficulty is usually experienced in handling the water which, as it increases, has to be hoisted a greater distance to the surface; when anything goes wrong with the pumps, or when a new stream is reached, the mine is often flooded so badly that work has to be suspended for longer or shorter periods as the case may be; and if no damage is worked to the timbers or in loosening the earth, a vast deal is lost in wasted time. It has been said of the mines on the famous Comstock lode that the owners would rather have imported every drop of water they needed from Europe in ounce vials than to handle the water that the mines have loosened as they sank lower. To have brought it from Europe as described would have been a mere bagatelle, a pittance, compared with the colossal fortunes that have been consumed in handling it as has had to be done. However, it will be seen that the absence of water in the Mammoth will prove of the most incalculable value in an economic point of view. Another peculiar feature may be mentioned in this connection. Both milling and smelting ores may be found side by side in the same level, and almost intermingling. This is due to the absense of water. As a rule smelting ores, containing as they do the baser metals, are only found below the water line of a mine. The water has a tendency to lexivate—that is, with the chemicals in the earth it acts as a solvent, and carries the baser metals in a dissolved form down, leaving only the nobler metals such as withstand the acqueous action, behind. The consequence is that milling ores are generally above, and the smelting generally below the water line. In the Mammoth, there being no trace of water, the baser and nobler metals are closely associated.

At the mine there are at present employed about 130 men, who manage to take out between seventy-five to 100 tons of ore daily, more than the mills are capable of handling, but an extra output will be required when the other furnaces are in readiness for working. The mine is pronounced by the ablest of experts to be a true fissure vein, and patented and free from lawsuits. It is opened up in an aggregate of several thousand linear feet of shafts, tunnels, levels, drifts, etc., and has been entered at different points, and a new tunnel is now being run in. Wherever new developments have been made, they tend only to show the almost boundless ore supply, and the great width of the vein, which is recorded as ninety feet in width. A depth of 600 feet has been reached, and a practical miner, who has had experience on the Comstock and mines all over the west, after getting to the bottom of this mine, and examining the ore at a depth of 600 feet, declared that it looked a great deal better there than at any point in the mine, and he looked upon it as one of the biggest things his eyes had ever opened upon. Wherever a pick is struck or a development prosecuted, new and surprising results are noted. It is as useless as impossible to go into a detailed description of the mine, as a general idea for the intelligence of the public is all that such a paper is expected to give. As before stated, the output of the mine is now placed by Mr. Johnson, the foreman, at seventy-five tons daily, and this, with the crudest of machinery—an old horse whim—the ore being hauled up by the bucket full. By this time an engine has been temporarily put in place, which will materially facilitate the hoisting and still further increase the output. Besides, the new tunnel and the main adit level, Mr. Plummer has laid the work for a new incline shaft, of three compartments, to run from the hillside straight into the vein at a depth of four hundred feet, on the angle of inclination of the vein. When this new shaft is completed a large engine will be placed at its mouth for the purpose of extracting ore from the mine, which will then have three independent sources of extraction, and an almost unlimited supply from a practically exhaustless mine will then be obtainable. It is Mr. Plummer's opinion, which he intends to put into practice at the Mammoth, that for every ton of ore extracted another ton should be prospected and opened up, so that the reserves of ore in sight should not be allowed to diminish. The surveyor has already located the site for the new incline shaft, and the same energy which has been infused into other departments of this great mine by Mr. Johnston will certainly be displayed in this connection. Timbers of the heaviest and most substantial kind have been shipped from Truckee and are now being put under the place where three vast caves have occurred and which have loosened between 6,000 and 10,000 tons of ore. With the developments now making, and with the new and improved machinery which is to take the place of the old-fashioned hoisting apparatus, fully 150 miners will find constant employment in this great mine. Wherever the vein has been tapped, it shows no diminution in extent, while it is a fact worthy of note that the lower the sinking goes, the richer becomes the character of the ore. It is therefore not to be surprised at that such vast preparations should be making to work so great a property. Moreover, it has, time and again, been experted, and every time with the same result—a result which serves only to impress upon one's mind the magnitude of the mine. Over twenty teams find constant employment in transporting ore to the mills alone, while 130 men are now employed in and about the mine, and with the starting up of new furnaces, the employment of additional men will be required until the force there alone will necessarily be largely increased. The ore contains gold, silver, copper and iron with traces of other metals, but is almost, if not entirely, free from lead, the average value being placed at $50 per ton, which, according to the judgement of experts, instead of being a maximum or even an average, is really a minimum estimate.

SUMMARY.

At present the fluxing material necessary to the reduction of ore is supplied by surrounding iron mines, of which two are owned by the company. However, negotiations are now pending looking to the purchase of a flux at a much greater distance, the idea being that the new flux will pay for itself in the valuable metals it will bring with it.

About 350 men, including masons and others, find constant and remunerative employment at the Mammoth mine and mills.

The refinery will be in readiness during the coming month.

The construction of a railroad between the mine and mills, for the purpose of hauling the ores, has been so seriously contemplated as to be viewed as a reasonable certainty, the realization of which the early summer is expected to demonstrate. The route has already been surveyed and the grading commenced.

It is among the projected plans of Mr. Johnstone to build cottages for such of the men as desire to rent them; while the utmost care looking to the health and comfort of the employees is to be seen, not only in present arrangements, but in these as yet awaiting an opportunity for being practically manifested.

The concentrating works are now ready, and have a capacity of about forty tons of tailings daily.

Flumes have been constructed for bringing additional water to the smelter from Death Creek, and will be laid in the ground as soon as the frost disappears.

Both the practical results and the assays show that about one-sixth the ore output is, converted into copper matte: that is, for every six tons of ore one ton of copper matte is realized.

Three crushers are to be put up on the new site—three sets of double rollers with revolving screens and incidental apparatus, affording a crushing capacity of about 200 tons daily.

The company use seventy-two tons of coal daily.

The company employs about 350 men who average some $3 each per day for wages, or an aggregate of about $1,100 per day for wages alone.

The production is now about one car load of copper matte per day averaging $3,000 per car load.

THE OUTLOOK.

In so detached and rambling an article is is difficult, if not impossible, to give any accurate idea of the Mammoth and the present working; but enough has been said—the truth being constantly adhered to—to give some conception at least of the magnitude of this property. With its opening and developments by Mr. Johnstone. Tintic has found a new life, for the Mammoth is now the great dependance of the country for miles around; and the great success and remarkable developments which attend the working of this mine are bringing Tintic into excellent repute, leading to inquiry regarding its mines, and begetting a confidence that nothing but the work done on the Mammoth could have brought about. This spring will see old and abandoned prospects seized upon, new ones will be taken up, and almost beyond the shadow of a doubt will show Tintic the leading mining district in the territory; all of which will be due to the work done on the Mammoth and the present and prospective condition of that property.

Mr. Johnstone is certainly American in one thing at least—the restless energy he displayes; for the most active Yankee would find it difficult to keep pace with him, and would find it still harder to be as thorough. It is to the welfare of Utah that the Mammoth should have fallen into such good hands—hands in which the mine will be worked for profit, and where its success will bring to us repute at home and abroad.

EXPERT REPORTS.

In closing this report, a few expert opinions are given that the public may gain some idea of the vastness and richness of the ore bodies lying within the Mammoth Mine.

Professor W. E. Faber says: "I thought of comparing the Mammoth with some other well-known mine of great extent and richness, but the Mammoth is unique and can only be contrasted, not compared. The ore is of a composition which could not possibly be more favorable for easy and cheap smelting. Silica, clay, iron and lime exist in the mass of the ore in precisely the proportions required to form a fusible and light slag without any fluxing, except possibly an addition of a little lime, which is cheap; while the quantity of sulphur in the ore is just enough to protect the copper from entering into slag, but not enough to render it necessary to roast the ore before smelting; and the ore seems quite free from arsenic, lead and zinc, which impurities occasion the chief expense in smelting copper ores which contain them. Thus, to eliminate these metals, the Swansea Smelter passes the ore through eight successive roastings and smeltings before refining, while the Mammoth ore will produce pig copper at a single smelting without any roasting at all. I do not know of another copper mine in the world possessing this extraordinary advantage, and at the same time, such rich ore and so much of it."

All the experts agree that there are at least 150,000 tons of ore "in sight," measurable and available, of a minimum value of $50 per ton, and in speaking of its prospective value, Captain Day says: "If the quartz in this vein continues productive going down, as it appears to do so far, and if it holds its apparent strength and extends lineally one-third the length of the claim, there are 3,000,000 feet; 150,000 tons of ore in each 100 feet in depth, or on each 100 foot level; suppose this should continue to a depth of 1,000 feet, we have, then, 1,500,000 tons of ore, which, at half the profit calculated on for the ore 'in sight,' would yield $30,000,000 net. This calculation only takes into account one-third of the mine lineally, and still it seems like romancing. Yet it is always possible that the ore should extend the entire length of the location, in which case, there is a mine half a mile long, which will still be productive fifty years hence."

Mr. J. W. Plumber, who was the last to inspect and report on this mine, February 1883, says, speaking of the financial prospects of the property: "We have been making calculations of the normal expenses of the establishment both at the mine and smelters, and allowing for 100 men at the mine, and a full force of men required at the head smelter for running thirteen furnaces, one furnace, the fourteenth, being used as an extra one to take the place of any requiring repair, and calculating the value of the Mammoth product, being an average taken from the company's books, of all the shipments since the first running of Smelters (but without taking into account any profits which may accrue from custom ores or tailings run through concentrators—which tailings have been variously estimated at from $150,000 to $200,000 value), and the result is that a comparison of the income and expenditures as shown in the enclosed statement shows a *net profit per month* of $49,200.00. This amount will give a dividend of 10 cents per share per month, and yet leave a clear balance of $9,200 to be carried to a reserve fund."